



Calhoun: The NPS Institutional Archive
DSpace Repository

Theses and Dissertations

1. Thesis and Dissertation Collection, all items

1992-12

Analysis of cost cutting transportation initiatives identified during the Defense Management Review process

Wiechelt, Thomas Frederick

Monterey, California. Naval Postgraduate School

<http://hdl.handle.net/10945/38514>

This publication is a work of the U.S. Government as defined in Title 17, United States Code, Section 101. Copyright protection is not available for this work in the United States.

Downloaded from NPS Archive: Calhoun



Calhoun is the Naval Postgraduate School's public access digital repository for research materials and institutional publications created by the NPS community. Calhoun is named for Professor of Mathematics Guy K. Calhoun, NPS's first appointed -- and published -- scholarly author.

Dudley Knox Library / Naval Postgraduate School
411 Dyer Road / 1 University Circle
Monterey, California USA 93943

<http://www.nps.edu/library>

2

NAVAL POSTGRADUATE SCHOOL

Monterey, California

AD-A260 617



DTIC
ELECTE
FEB 23 1993
S c D

THESIS

ANALYSIS OF COST CUTTING TRANSPORTATION
INITIATIVES IDENTIFIED DURING THE DEFENSE
MANAGEMENT REVIEW PROCESS

by

Thomas Frederick Wiechelt

December, 1992

Principal Advisor

Dan C. Boger

Approved for public release; distribution is unlimited

93-03755



6709

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE				
1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS	
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.	
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE				
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S)	
6a. NAME OF PERFORMING ORGANIZATION Naval Postgraduate School		6b. OFFICE SYMBOL (If applicable) 55		7a. NAME OF MONITORING ORGANIZATION Naval Postgraduate School
6c. ADDRESS (City, State, and ZIP Code) Monterey, CA 93943-5000			7b. ADDRESS (City, State, and ZIP Code) Monterey, CA 93943-5000	
8a. NAME OF FUNDING/SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)				
10. SOURCE OF FUNDING NUMBERS				
Program Element No.		Project No.		Task No.
				Work Unit Accession Number
11. TITLE (Include Security Classification) Analysis of Cost Cutting Transportation Initiatives Identified During The Defense Management Review Process				
12. PERSONAL AUTHOR(S) Wiechelt, Thomas, Frederick.				
13a. TYPE OF REPORT Master's Thesis		13b. TIME COVERED From To		14. DATE OF REPORT (year, month, day) 1992, December, 17
15. PAGE COUNT 67				
16. SUPPLEMENTARY NOTATION The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
17. COSATI CODES			18. SUBJECT TERMS (continue on reverse if necessary and identify by block number) Defense Management Review, Transportation, Defense Management Review Decisions.	
FIELD	GROUP	SUBGROUP		
19. ABSTRACT (continue on reverse if necessary and identify by block number) Faced with the likely prospect of steadily declining defense budgets the President initiated the Defense Management Review (DMR). In response to this review, DOD agencies identified \$38B in cost savings initiatives. This thesis provides the reader with a comprehensive analysis of those transportation-related initiatives addressed by specific Defense Management Review Decisions (DMRD) as well as those that indirectly emanated from the general DMR process. Also included is an introduction to the complicated issue of transportation funding which covers both the Defense Business Operations Fund (DBOF) and unit costing. Finally, the author discusses the current funding shortfall that the Air Mobility Command (AMC) is experiencing as a result of the reduction in military transportation budgets. The author concludes with a summary of the discussed issues, highlighting the strengths and weaknesses of each.				
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input checked="" type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL Professor Dan C. Boger			22b. TELEPHONE (Include Area code) 408-656-2607/2772	
			22c. OFFICE SYMBOL AS/Bo	

DD FORM 1473, 84 MAR

83 APR edition may be used until exhausted
All other editions are obsoleteSECURITY CLASSIFICATION OF THIS PAGE
Unclassified

Approved for public release: distribution is unlimited

Analysis of Cost Cutting Transportation Initiatives
Identified
During the Defense Management Review Process

by

Thomas Frederick Wiechelt
Lieutenant, United States Navy
B.S., Clarion University of Pennsylvania, 1981

Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
December 1992

Author:

Thomas F. Wiechelt

Approved by:

Dan C. Boger, Principal Advisor

William R. Gates, Associate Advisor

David R. Whipple, Chairman
Department of Administrative Sciences

Abstract

Faced with the likely prospect of steadily declining defense budgets President Bush initiated the Defense Management Review (DMR). In response to this review, DOD agencies identified \$38B in cost savings initiatives. This thesis provides the reader with a comprehensive analysis of those transportation-related initiatives addressed by specific Defense Management Review Decisions (DMRD) as well as those that indirectly emanated from the general DMR process. Also included is an introduction to the complicated issue of transportation funding which covers both the Defense Business Operations Fund (DBOF) and unit costing. Finally, the author discusses the current funding shortfall that the Air Mobility Command (AMC) is experiencing as a result of the reduction in military transportation budgets. The author concludes with a summary of the discussed issues, highlighting the strengths and weaknesses of each.

DTIC QUALITY INSPECTED 3

Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

TABLE OF CONTENTS

I. INTRODUCTION	1
II. TRANSPORTATION COST REDUCTIONS RESULTING FROM THE	
DMR	4
A. BACKGROUND	4
1. DOD Transportation Funding Overview	5
2. Defense Business Operation Fund/Transportation	
(DBOF/T)	7
B. DEFENSE MANAGEMENT REVIEW DECISIONS (DMRD) . . .	8
1. DMRD 901	9
2. DMRD 902	11
3. DMRD 926	12
4. DMRD 915	14
a. Current Initiatives	16
(1) Guaranteed Traffic Program.	16
(2) Prepayment Auditing Program.	16
(3) Air Challenge Program.	17
(4) Electronic Data Interchange (EDI) and	
Electronic Funds Transfer (EFT)	
Program	17
(5) Carrier Qualification and Performance	
Program.	17

(6) Regional Freight Consolidation Centers.	18
b. New Initiatives	18
(1) Transportation Protective Services (TPS).	18
(2) Consolidate Small Package Shipments.	19
(3) Manage/Control UMMIPS.	19
(4) Direct Shipments from Vendors. . .	21
(5) Maximize the Use of Organic Cargo Airlift.	21
(6) Improve Intransit Visibility. . .	22
C. CONCLUSION	23
III. UNIT COSTS AND THE TWO TIER PRICING PROGRAM . . .	25
A. BACKGROUND	25
1. Unit Costing	26
2. Current UMMIPS situation	28
3. Reducing the Navy Transportation Bill . . .	31
4. DLA Two Tier Pricing System	31
5. Discussion of two tier pricing proposal . .	32
B. RESPONSES TO DLA TWO TIER PRICING PROPOSAL . .	33
C. CONCLUSION	36
IV. ANALYSIS OF THE COSTS AND CAPACITY OF ORGANIC AIRLIFT	38

A. BACKGROUND	38
1. Reduced Airlift Demand	41
2. UMMIPS Time Frames	41
B. EFFECT OF CARGO HOLDING ON AIRCRAFT UTILIZATION	44
1. LMI Assessment of Delivery Quality	46
2. LMI Conclusions	47
3. Analysis of LMI Conclusions	50
V. SUMMARY	53
APPENDIX. LMI QUESTIONNAIRE	56
LIST OF REFERENCES	59
INITIAL DISTRIBUTION LIST	60

I. INTRODUCTION

Since peaking as a percentage of the Gross Domestic Product (GDP) in 1985, the defense budget has consumed a decreasing portion of our economy. This gradual reduction in spending has our country investing the lowest levels in defense in over thirty years. Careful planning by defense experts is required to avoid the historical pitfalls that have plagued our country during military downsizing. Inappropriate decisions during this relative lull in world unrest can result in unnecessary and costly recovery in future years.

As the services shrink, the requirement for a more mobile military becomes imperative. A smaller force structure will require the ability to rapidly concentrate the available resources more quickly than in the past. This issue is being addressed by the various services through each of the service transportation commands. The Military Traffic Management Command (MTMC) is operated by the Army and is concerned with the land transportation and terminal needs of the military. The Navy's defense transportation mission is performed by the Military Sealift Command (MSC). In this role, MSC is responsible for the heavy sealift of supplies and materials. The Air Mobility Command (AMC) is under the auspices of the Air Force and is responsible for the air shipment mode of the DOD transportation system. These transportation managers,

along with the logistic support infrastructure, must actively seek to find better and more cost efficient methods to successfully meet their established objectives. This thesis will review some currently pending issues and alternatives which are being considered by DOD policy makers.

Long before the demise of the Soviet Union, the executive branch anticipated the need to reduce what was perceived as a burgeoning defense support structure. In a proactive move early in his administration, President Bush initiated a program to review and identify these inefficiencies. His program was dubbed the Defense Management Review (DMR) and was designed to task the various DOD activities with the responsibility of identifying \$30B in department-wide savings. The response to this challenge was thirty eight Defense Management Review Decisions (DMRD) with a total identified savings of over \$38B. Chapter II of this thesis addresses the four DMRDs that affect the DOD transportation system and focuses on one that is primarily concerned with transportation. Also included is a discussion on transportation funding and the development of the Defense Business Operations Fund (DBOF).

Chapter III is a review of the Defense Logistic Agency's (DLA) proposal for a two tier pricing system. The discussion includes a review of the DOD comptroller's unit costing theory. This discussion includes an economic analysis of the foundations on which unit costing is based, as well as a

review of what DLA views as its advantages. It also reviews the current Uniform Material Movement Issue Priority System (UMMIPS), including the newly implemented modifications that separate the issue priority from the shipping priority. This analysis is of particular interest since its implementation adds a great deal of flexibility to the transportation cost reduction program. Finally, the discussed plans and proposals are presented to various DOD experts who review and comment on their potential for actual implementation.

The fourth chapter delves into the subject of organic military air transportation. After discussing an AMC practical experiment concerning cargo holding time, the chapter examines the options available to the AMC in reconciling competing variables. The chapter continues by examining the currently pending UMMIPS timeframe changes, including both a DOD and Air Force proposal. Finally, an Air Force commissioned study is examined. The study was conducted by a defense related think-tank to assess the validity of the Air Force's practical experiment.

The final chapter summarizes the various initiatives currently being considered by DOD.

II. TRANSPORTATION COST REDUCTIONS RESULTING FROM THE DMR

A. BACKGROUND

Shortly after his inauguration in January of 1989, President Bush announced that a comprehensive review would be conducted in the Department of Defense to identify economies and efficiencies which could be achieved. This led to the July 1989 Defense Management Review (DMR) sponsored by the Secretary of Defense. The DMR proposed six (6) broad objectives:

- To reduce overhead in DOD while maintaining military strength.
- To improve weapon systems performance.
- To revitalize the department's Planning Programming and Budgeting System (PPBS).
- To reduce micro management.
- To strengthen the industrial base for defense initiatives in American industry.
- To improve observances of ethical standards in government and industry.

The major goal of these objectives was to identify savings totaling \$30 billion that would offset cuts already implemented for the period FY 91-95.

As the Chief Executive, President Bush's effort to contain costs was visionary in light of the recent demise of the then Soviet Union and Eastern Bloc. The shift in public opinion

that has occurred since these world events has intensified the requirement for the "support side" of DOD to trim costs in order to minimize the effects that force structure or readiness might otherwise absorb.

1. DOD Transportation Funding Overview

The increases in the late 1980s in DOD transportation costs can be traced to the spiraling industrial fund rates. Increases in these rates were driven by the reliance upon commercial carriers, particularly ocean carriers. Federal law requires that no more than 50% of DOD cargo be moved on MSC ships. The remaining cargo must move on a United States flag carrier at market prices. The increased ocean transportation costs were the market reaction to the then burgeoning export trade of the United States resulting from the weakening dollar. [Ref. 1:p. 3-1]

The DOD funding for transportation was \$8.8B in FY-88. This total was divided into two main object classes: passenger, \$4B, and cargo transportation, \$4.8B. Cargo transportation was further divided into the two main categories: household goods, \$1.4B, and freight, \$3.4B. The focus of this discussion will be on the two major freight transportation accounts: first destination transportation, \$168.3M, and second destination transportation, \$1.58B.

First destination transportation costs are those incurred when transporting newly procured supplies and

equipment from the vendor to the initial storage site. The larger account, second destination charges, is to pay for costs incurred for moving the material from the storage site to its final destination. These second destination transportation costs are where the majority of the \$179M increase in transportation costs fell in FY-89. The majority of costs incurred due to these second destination costs are for movement of military supplies and equipment (Fig. 1-1). [Ref. 1:p. 1-1 - 1-2]

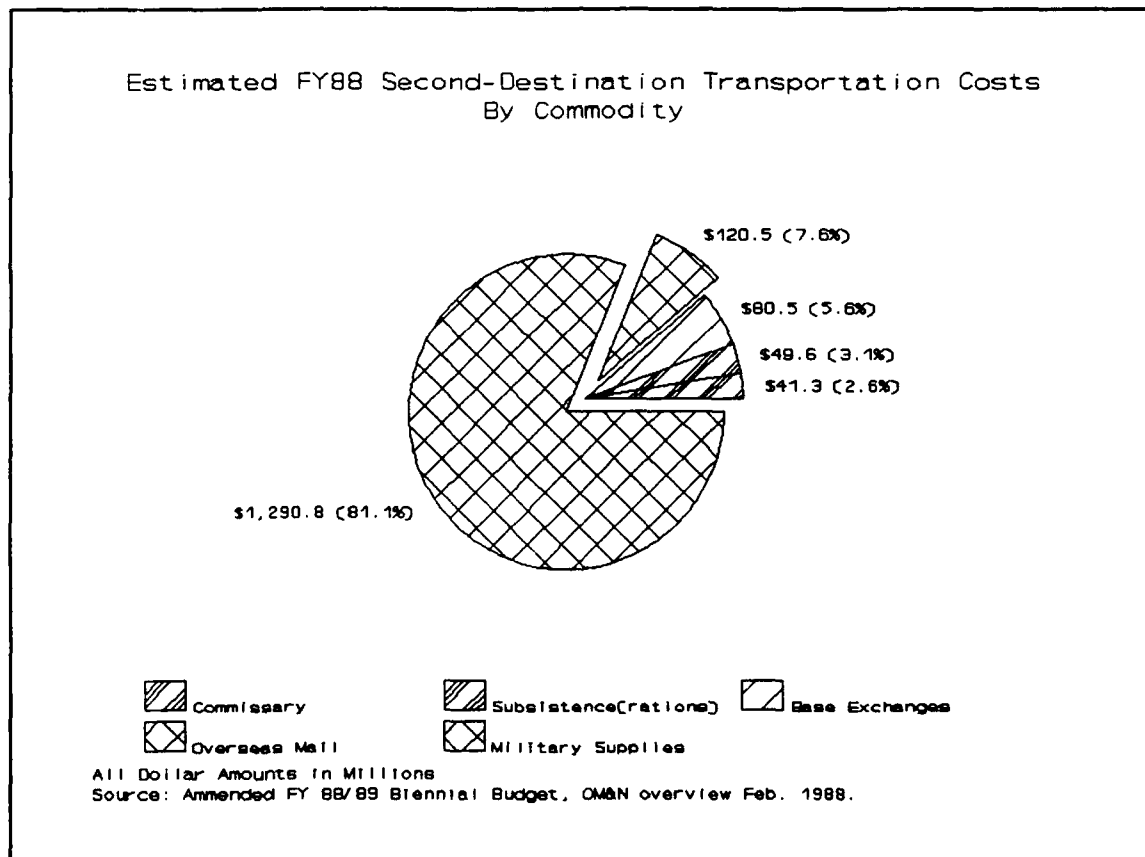


Figure 1-1 Second Destination Transportation Costs by Commodity

2. Defense Business Operation Fund/Transportation (DBOF/T)

The Defense Business Operation Fund / Transportation (DBOF/T) is the portion of DBOF that is designed to support servicewide transportation costs. The AMC DBOF/T subaccount is a revolving fund designed to support all of the operating costs of AMC. The level of money in the subaccount at any given time is a function of revenues and expenditures. The majority of AMC's expenditures are of a variable nature such as fuel and civilian-contracted air services. AMC DBOF/T subaccount revenues primarily come from cargo airlift revenues and training appropriations.

Under the original rules, AMC was to develop rates based on the next year's projected budgets and workload. Each year the rates would be revised with the reconciliation of any surplus/deficit of funds from the previous year being included in the new rates. In an effort to avoid penalizing their customers for utilizing government services, OSD (P&L) decided that it would be better to require AMC to match the current commercial shipping rate. AMC budget planners now establish annual AMC rates for cargo airlift commensurate with commercial services. Since the annually established rate is susceptible to extraneous pressures, such as fluctuating fuel and maintenance costs, cargo revenues will routinely differ from costs. To compensate for these fluctuations in revenues,

all funding differences will be reconciled through supplemental OSD funding.

Another deviation from the original DBOF concept is that AMC receives a direct reimbursement for all military pay costs incurred by AMC. Under the original DBOF concept, all costs incurred by an organization were to be reflected in the cost of the goods or services provided. This is particularly interesting considering that military pay is about 30% of the total costs incurred by AMC.

Prior to the Defense Business Operation Fund (DBOF), each mode of the military transportation system had its own industrial fund account. These accounts received annual funding to cover the costs of operations and were to be reimbursed based on a SECDEF established rate. These rates were established over a year in advance of the applicable fiscal year, and tended to fluctuate wildly while trying to compensate for actual expenses. In 1990 all of the transportation industrial funds were combined and are now collectively known as the Defense Business Operation Fund / Transportation (DBOF/T).

B. DEFENSE MANAGEMENT REVIEW DECISIONS (DMRD)

The result of the Defense Management Review was a list of thirty eight Defense Management Review Decisions (DMRD). These DMRDs projected a total savings of \$39B. The Navy's share was \$11.9B. [Ref. 2:p. 6]

Of these thirty eight DMRDs, three have some impact on the Defense Transportation System and one is completely focused on transportation cost reductions. With the exception of DMRD 915, the focus of these directives is in areas other than pure transportation matters, but as the following discussion will support, they are certainly worthy of consideration in this analysis of transportation costs.

DMRDs with transportation implications are the following:

- DMRD 901 - Reducing supply system costs.
- DMRD 902 - Depot consolidation.
- DMRD 926 - Inventory control point consolidation.
- DMRD 915 - Reducing transportation costs.

1. DMRD 901

DMRD 901, "Reducing Supply Systems Costs," has the largest impact in terms of infrastructure and cost savings potential. The major point of this directive is to allow the universal visibility of Inventory Control Point (ICP), stock point and retail assets to the inventory manager in order to reduce physical distribution expenses. The visibility of these assets will allow defense item managers to direct the issue of needed material to the customer from the geographically closest storage location thereby minimizing transportation costs. Opposition to this policy exists in some of the services because it is felt that they will have less control over what they feel are strategically located assets. This

argument has increasingly less credence considering the present world political situation and should be disregarded.

[Ref. 3:p. 8-9]

Another recommendation by the Undersecretary of Defense is the positioning of Ready For Issue (RFI) material and stockpiling of repairable components awaiting induction into a repair facility (Non-RFI components) in more economical locations. Current policy for material location has each local supply point establishing parts inventory and safety levels to support forecasted demand and centrally storing NRFI turn-ins awaiting overhaul in Norfolk or San Diego. By eliminating double handling of parts and storing NRFI carcasses closest to the designated overhaul point, significant savings in both transportation and inventory management costs are possible. Additionally, improving the information and communication systems between wholesale activities and customers has reduced the requirement for intermediate inventories at local supply points.

These administrative improvements reduce the need to stage large intermediate quantities at local supply distribution points by reducing the ICP leadtime. This reduction in leadtime will significantly reduce second destination transportation and inventory holding costs incurred by intermediate inventory holders. Now, the requirement can often be shipped directly from the manufacturer or wholesale stock point. Finally, with improved

forecasting, more effective inventory levels can be established for deploying units consolidating many repair parts aboard combat logistic ships and storage facilities ashore. [Ref. 3:p. 9]

2. DMRD 902

DMRD 902, "Consolidation of Defense Supply Depots," directed DLA to assume all defense material distribution functions currently conducted by the Department of Defense supply depots. It also approved a pilot plan to consolidate interservice material distribution operations in the San Francisco Bay Area in order to test the hypothesis that economies of scale are possible. This test included evaluating a new software system that interfaced with the various service systems, assessing the impact on customer service, and developing future consolidation strategies. [Ref. 4:p. 10]

A key part of the prototype effort is to determine the systems support required to optimize the opportunities for consolidation and streamlining material distribution functions. The result of these efforts has been named the Defense Distribution System (DDS). This standardized system is made up of the DLA Warehousing and Shipping Procedures (DWASP), the Air Force Stock Control and Distribution (SC & D) System and the Navy's Integrated Storage and Retrieval System (NISTARS).

Shipping will be supported through DWASP automated shipping and transportation functions, including shipment planning, transportation unit consolidation, rating, routing, carrier selection, GBL preparation, small parcel costing, mode selection and manifesting. The anticipated savings from these initiatives are due to the economies expected from standardizing the defense material distribution functions and systems.

Some senior Navy leaders feel that implementing DDS is a prudent decision but differ on who should actually perform the local supply depot function. These leaders think that if DLA runs the organization a serious void will occur in customer service unless the Navy has their own hierarchy to perform that function. It is argued that this duplicity of command will nullify any cost savings attributed to consolidation. [Ref. 4:p. 10]

The author's experience has been that service organic customer support is transparent from the depots. The primary functions of receiving, stowing, issuing and transporting requirements could easily be assumed by DLA with few adverse effects.

3. DMRD 926

DMRD 926, "Consolidation of Inventory Control Points," calls for two major changes: 1) the transfer of approximately 1.4 million consumable items from the services to DLA and 2)

the reduction by consolidation of the 20 DOD inventory control points.

With regard to the consumable transfer, DMRD 926 proposed a material migration of historic proportions. The services would be required to transfer custody of about one million consumable parts to the Defense Logistic Agency. Services were allowed to maintain custody of specialized consumables in view of the Secretary of Defense's (SECDEF) own 1985 Weapon Systems Management Objectives, but the vast majority of consumables are now to be maintained by DLA.

DMRD 926 also calls for consolidating the 20 DLA/service controlled inventory control points. The options offered by DOD included:

- Each service consolidates its own ICPs
- DLA take over all ICPs
- Organize ICPs by service by commodity

After a great deal of discussion, DOD and the services agreed that each would consolidate its own ICPs. Everyone considered the other two options to run counter to the SECDEF's 1985 Weapon System Management Objectives.
[Ref. 5:p. 22]

Physically transferring consumable inventories to DLA activities is a double-edged sword. The transportation costs associated with transferring consumable material to the DLA activity consolidation point is an additional expense that will take some time to recover. On the other hand,

substantial savings are possible through reduced manpower at the depots to manage these consumable items. Additionally, by shipping the customer requests directly from the wholesale level to the customer, the second destination transportation costs (depot to customer) are eliminated.

Consolidating the Defense Logistic Agency and service inventory control points offers the most promise for cost savings in DMRD 926. The services' reluctance to move to all DLA managed inventory control points is parochial. The impact of the ICP is completely transparent to the customer. Because this part of the consolidation is more concerned with eliminating parallel management structures than with relocating material, significant economies of scale are possible.

4. DMRD 915

DMRD 915, "Reducing Transportation Costs," undoubtedly has the largest impact on cost reductions in the transportation field. As highlighted in the executive summary of DMRD 915, DOD has recently experienced a \$179M increase in transportation costs. This increase has aggravated budget shortfalls which threaten to degrade readiness and sustainability either through delaying shipments or diverting funds from other accounts.

The Navy has identified, and in some cases expanded, the following DMRD 915 initiatives to help achieve the savings mandated by the DMR:

1. Guaranteed traffic program
2. Prepayment auditing
3. Air challenge program
4. Electronic data interchange and electronic funds transfer
5. Carrier qualification/performance programs
6. Regional freight consolidation centers
7. Transportation protection services
8. Consolidate small package shipments
9. Manage/control UMMIPS
10. Direct shipments from vendors
11. Maximize use of organic cargo airlift
12. Improve intransit visibility

The three to five year time line that exists for fully implementing the listed programs leaves DOD with three options in the short term: 1) increase transportation funding, 2) reduce programs, or 3) divert shipments to less expensive modes. As a result of defense budget cuts and the \$179M increase in second destination costs, the services will increasingly be forced to rely on options 2 and 3.

[Ref. 1:p. 3-2]

a. Current Initiatives

Initiatives one through six above are ongoing efforts that can yield significant cost reductions if expanded or given higher level DOD support. Each will be briefly summarized emphasizing their future potential for additional savings.

(1) *Guaranteed Traffic Program.* Launched in 1979, the guaranteed traffic program involves awarding a single carrier long term large traffic volumes between specific shipping and receiving activities. In spite of the over \$300M saved since its implementation, the only DOD agency to fully embrace it has been DLA. By increasing the services' participation, DOD anticipates savings of over \$30 million annually. [Ref. 1:p. 2-1]

(2) *Prepayment Auditing Program.* In 1986, Public Law 99-627 gave GSA the right to delegate prepayment auditing authority to DOD. GSA responded by giving DOD limited delegation of prepayment authority for international household goods bills at the United States Army Finance and Accounting Center. The prepayment auditing of those bills has saved the government over \$2 million through 1988. DOD planners received full prepayment auditing authority in July 1988 and expect annual savings to exceed \$40 million annually upon full implementation. [Ref. 1:p. 2-3]

(3) *Air Challenge Program.* Instituted in 1976, the Air Challenge Program examines individual air shipments to determine if a less costly mode of transportation is appropriate. This review of shipments designated by the Uniform Material Management Issue Priority System (UMMIPS) as air eligible results in over \$117M in annual savings. [Ref. 1:p. 2-4]

(4) *Electronic Data Interchange (EDI) and Electronic Funds Transfer (EFT) Program.* These technologies are being tested or applied throughout DOD. EDI facilitates exchanging standard business documents via electronic means, usually a wide area network. EFT accommodates a similar transfer but for payments and remittance advice information. DOD estimates that \$10M to \$17M in savings are possible after fully implementing this technology. [Ref. 1:p. 2-5]

(5) *Carrier Qualification and Performance Program.* This program was implemented in the mid 80's by the Military Traffic Management Command (MTMC) in response to the other-than-optimal service they were receiving from some carriers. The deregulation of the trucking industry resulted in lower rates but also opened the doors to some poorly managed carriers. By requiring carriers to meet minimum standards, DOD has effectively stemmed many of the losses associated with unscrupulous or incapable contractors. Savings under this

program are indirect and therefore difficult for DOD to quantify. [Ref. 1:p. 2-7]

(6) *Regional Freight Consolidation Centers.* Freight consolidation centers are widely used in the transportation industry to consolidate less-than-truckload (LTL) shipments into truckload (TL) shipments. This consolidation generally results in dramatic cost savings and improved services. The government historically has spent upwards of 38% of its highway freight budget on LTL shipments while civilian firms spend less than 10%. LTL shipments are estimated to cost seven times more than identical shipments at the TL rate. Fully implementing this program is expected to result in over \$60M in savings annually. [Ref. 1:p. 2-8]

b. New Initiatives

The remaining six initiatives are new and show great potential for cost saving but presently are only planned.

(1) *Transportation Protective Services (TPS).* Protective services for freight shipments are currently estimated to cost the government about \$19M a year. The bulk of this cost goes to support escort vehicles and armed guards. Implementing mobile satellite-based positioning and reporting systems is thought to hold tremendous potential in limiting these costs. This technology allows managers to monitor the driver's location and routes from the moment he departs the

pickup point. Annual savings upon fully implementing this program are expected to be between \$1.6M and \$2.5M.

[Ref 1:p. 2-9]

(2) *Consolidate Small Package Shipments.*

Consolidating small package shipments has interested DOD for several years. Unlike LTL shipments, small package shipments are generally high priority in nature and require immediate delivery. DOD is currently preparing a small package express contract that will award all international DOD small package shipments to one US flag carrier. Immediate savings of \$2M can be expected for DOD's largest express shipping customer, the Defense Mapping Agency. DOD suggests significant additional savings can be obtained if this program is implemented department-wide. [Ref. 1:p. 2-10]

(3) *Manage/Control UMMIPS.* DMRD 915 cited the 1989

Inspector General's report finding that almost 50% of all DOD requisitions are inappropriately ranked as high priority items incurring premium transportation charges. This same report charges that requisitioners often irresponsibly boost the issue group priority in order to circumvent the Uniform Material Movement and Issue Priority System. During research for this thesis, Tom Hardcastle of Logistic Management Institute (LMI), who penned DMRD 915 for the Undersecretary of Defense, was asked how he concluded that basing transportation priority on both issue group and required delivery date

entries could correct the existing abuse of the UMMIP system. He said he feels that by requiring requisitioners to cite a required delivery date on an Issue Group 1 or 2 requisition of less than twenty one days, they will more thoughtfully consider their choice of transportation mode. [Ref. 1:p. 2-11]

The reasons abuses of the UMMIP system occur are many, but for the shipboard Supply Officer two come to mind. First, the majority of requisitions are for not carried items ordered by shipboard customers to complete some sort of in-process maintenance action. The Supply Officer assigns issue group priorities based on the urgency of need expressed by the customer. Second, regular underway periods and fluctuating schedules complicate issue group priority selection. Because of these factors, 75% of requisitions for material not carried on the ship or at the local supply point are ordered under the issue group priority 1 or 2 designation. The breakdown of the UMMIPS time frames are transparent to the customer and shipboard Supply Officer. If the local Supply Depot cannot fill the requisition today, the maintenance action can not be completed and shipboard readiness is affected until the part arrives and the repair is made. This decision process is supported by the NAVSUP-implemented caveat that a maximum of 50% of all requisitions may be ordered under the issue group one or two priority designations. The requirement to use an RDD of less than twenty one days in the future will alone have little effect on the conservation of

limited high priority transportation dollars. A solution to this problem will only occur after introducing a transportation priority assignment system where the ordering activity incurs the cost of premium transportation. This theory can only be applied if unit commanders are provided with earmarked funds for this purpose. This system will force operational units to make hard decisions as to what is in fact a readiness issue and what is not. A system of this type could make the air shipment challenge program obsolete by forcing the initiator of the requisition to financially rationalize his decision.

(4) *Direct Shipments from Vendors.* Shipping freight directly from the vendors to the final customer has tremendous potential for reducing costs for two reasons. First, shipping directly to the customer reduces second destination charges, the area of the most growth in the transportation budget. Secondly, by shipping directly from the vendor, warehousing and inventory control costs could be reduced. This system would be better suited for less critical materials and parts and is not meant to replace the supply system. [Ref. 1:p. 2-12]

(5) *Maximize the Use of Organic Cargo Airlift.* Freight designated by UMMIPS as air or air eligible is shipped via AMC as a first choice, with commercial air being used as backup. The recent focus on the high cost of air

transportation has resulted in much of this cargo being diverted to less expensive modes of surface transportation. The result has been a false economy since excess capacity now exists on many AMC aircraft. The "savings" that has occurred as a result of the air challenge program is therefore distorted. [Ref. 1:p. 2-14]

Some hypothesize that if AMC utilized the RDD vice the UMMIPS issue group priority system as a determining factor when assigning shipments to specific flights, AMC could more effectively manage the surges in transportation requirements. This would decrease reliance on more expensive commercial transportation. These individuals fail to realize that the cost of the AMC flying hour program is a sunk cost for DOD. There are real efficiencies to be gained by effectively managing training and transportation requirements. Alternatives identified by experts are based on formulas that would charge for services based on actual usage. This type of logic is similar to the above proposal that transportation be funded by the demanding activity.

(6) *Improve Intransit Visibility.* Commercially developing intransit visibility systems capable of tracking over one million shipments simultaneously is a technological breakthrough the government could utilize with a relatively small capital investment [Ref. 1:p. 2-14]. These "state of the art" systems have numerous applications including:

- Improved readiness through the ability to divert critical material in route.
- Enhancing the regional freight and small package consolidation systems by providing planners with the ability to forecast requirements.

C. CONCLUSION

The root of the projected \$2B transportation deficit by FY-94 is increased second destination charges for ocean carriers [Ref. 1:p. 1-7]. Overcoming market forces is beyond the scope of DOD, especially in light of the political and military pressures to maintain a United States liner fleet. Solutions to overcoming these shortcomings in DOD transportation funding lie in policy reorganization and implementing cost-saving initiatives. Specifically, the DBOF/T revolving fund and second destination transportation charges have been identified as the areas in which the largest savings can be achieved. The purpose of revolving funds are solely to provide working capital to finance transportation costs for DOD customers. As the DBOF implementation proceeds, many difficulties will be encountered with these revolving funds that will suggest modifications in their original principles.

Second destination transportation costs require much more ingenuity to handle. The first eight initiatives discussed above are estimated to save over \$240M a year upon full implementation [Ref. 1:p. 2-15]. This savings goes a long way

toward offsetting the projected deficit, but more is needed. None of the remaining three initiatives have been costed for savings, but the UMMIP system is outdated and appears to afford the most opportunity for transportation savings. By putting the onus for transportation costs on the requisitioner, the requirement for premium transportation can be reduced. The present communal system produces no benefits for the prudent financial manager.

With the current economic and budgetary environment, we can only expect tighter funding constraints as Congress looks to defense cuts to solve the federal deficit problem. World political events are allowing us an opportunity to stand back from our readiness-at-all costs ideals and make some cost effective decisions; we need to make them.

III. UNIT COSTS AND THE TWO TIER PRICING PROGRAM

A. BACKGROUND

In the years since the Defense Management Review Decision (DMRD) 915 was published, the world has undergone an unforeseeable metamorphosis: the Berlin Wall is gone, the Soviet empire has collapsed and the United States has emerged as the last remaining military superpower. However one might view these events, one thing is certain; the Department of Defense (DOD) will be scrutinized with regard to efficiency like never before. As far as transportation savings are concerned, DMRD 915 initiatives are being viewed as only the starting point for future efficiencies and spending cuts.

A common perception throughout DOD is that excessive transportation costs result from abusing the Uniform Material Management Issue Priority Systems (UMMIPS). The Defense Logistic Agency (DLA) feels that the UMMIP System has outlived its usefulness and should be replaced by a two tier pricing system that they say is founded upon the acting DOD comptroller's (Mr. Donald Shycoff) unit cost theory. In order to introduce the debate, unit costing is discussed and both the UMMIP and two tier pricing system are described.

This chapter introduces some factors and externalities that complicate the analysis of the various initiatives under

consideration. Next, the various strengths of each initiative as seen by various DOD policy makers are compared and contrasted. Finally, conclusions based on research and personal experience are considered.

1. Unit Costing

In 1987, Mr. Donald Shycoff, while working at DLA, came upon the idea of "unit costing." Unit costing was heralded as an idea whose time had come. The purpose was to improve efficiency and productivity. In 1992, Shycoff became the acting comptroller for the Department of Defense (DOD) and unit costing became a DOD-wide concept. According to DLA, unit costing is nothing more than the concept that all costs incurred at an activity should find their way into some measure of output [Ref. 6:p. 1]. The idea is to apply business accounting methods to determine if an activity is recovering their costs. Of course, DOD is not interested in turning a profit, so the price charged per output is designed to recover only the activity's costs. In unit costing, the price for each output is determined prior to the beginning of the fiscal year by dividing this year's total costs by next year's expected output. With world events being what they are, it goes without saying that "next year's projected output" is only an educated guess. To compensate for these expected fluctuations, the Defense Business Operations Fund (DBOF) has been established. DBOF will fund service

organizations for periods when revenues do not cover costs with the understanding that the services will reimburse DBOF in future years when revenues exceed costs. At first glance, this idea seems possible, but some economists disagree with the concept of a nonprofit organization applying business-type accounting in order to generate efficiency.

Mr Shycoff's theory treats points on the average total cost (ATC) curve as if they were marginal costs. His assumption, that unit costs based on the ATC can be compared across activities without regard to the position of the ATC, is faulty. Though points on a marginal cost (MC) curve and on a ATC curve are both sensitive to quantity, only marginal costs can be compared across activities, regardless of the quantity produced, to determine where to produce an additional unit of output. The reason for this is that average total costs consider both fixed and variable costs. Only variable costs change with output. Thus, the cost of producing an additional unit of output is measured by the change in variable costs. Marginal costs track the incremental cost of producing one more unit by only considering variable costs. Unit costs based on average total cost curves can only be compared across activities when both the position of the curve and the quantity produced are identical.

In support of this position, economists offer the following: First, assuming that two activities have the same average total cost curve (same efficiency), quantity over

which they have no control drives the cost of their service (see Figure 3-1). Threatening to close inefficient activities based on this premise would be incorrect and could possibly lead to gaming.

Secondly, assume that two activities have different average total cost curves (different efficiencies). The quantity produced by each activity, again over which they have little control, could lead the casual observer to assume a firm with a higher average total cost curve was more efficient. That firm may have a lower unit cost in spite of having higher average costs (see Figure 3-2).

The inability to compare the unit cost of identical outputs across competing activities leads one to question the usefulness of unit costing. Economists draw similar conclusions when attempting to compare average total costs and profits across activities and conclude that without a free market and profit motivation it is difficult for DOD to apply a market solution. [Ref. 6:p. 7]

2. Current UMMIPS situation

The UMMIP system has been in use for over twenty years. The issue priority is based on the urgency of need as well as the fleet activity designator. Issue group one requisitions are assigned priorities one through three and, as such, warrant high priority transportation, usually air. Issue group two requisitions are assigned priorities four

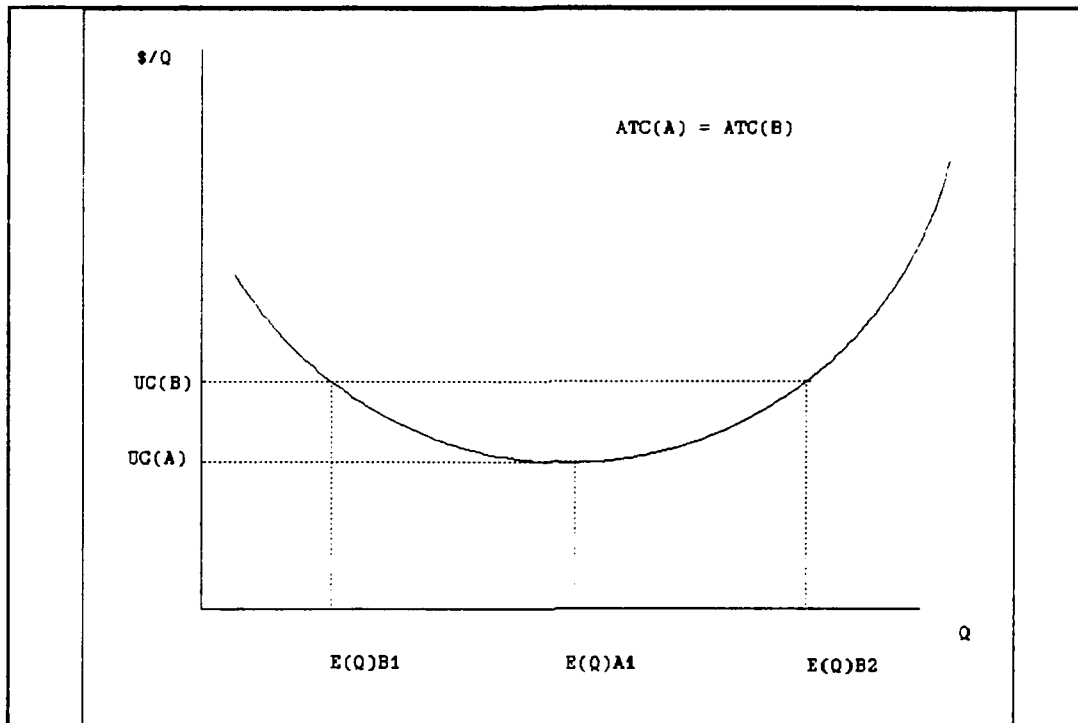


Figure 3-1 Unit Costs Of Firms With The Same ATC Curve

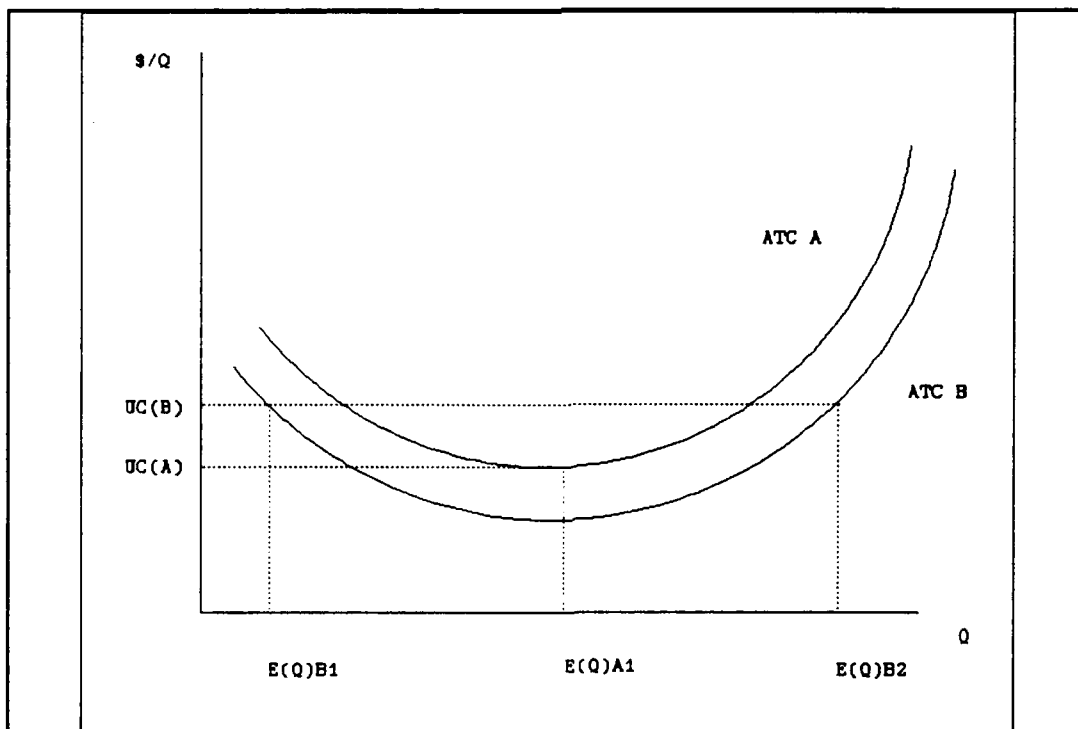


Figure 3-2 Unit Costs Of Firms With Different ATC Curves

through eight and are considered air eligible. Many inventory levels are insulated from routine demands and can only be accessed with an issue group one requisition. When an issue group one requisition is cut for a requirement it is considered to be urgent and, as such, receives both high priority warehouse handling and premium transportation. Currently, a flat 2.5% surcharge is assessed on all requisitions to cover the average cost of transportation. This value-based assessment has effectively worked in the past. However, DOD's new unit costing initiatives are projected to cause deficits of up to \$400M in the transportation funds by the mid 90s. [Ref. 1:p. 1-6]

Often an activity will assign a requisition an Issue Group one priority solely to penetrate protected inventory levels. As a result of DMRD 915, the Naval Supply Systems Command (NAVSUP) has implemented a method in which requisitioners can penetrate inventory levels without incurring premium transportation and inventory handling charges. This change is referred to as "modified UMMIPS procedures." Under these new procedures, the requisition priority is assigned to a requisition as in the past but a new link has been established between the priority and required delivery date. A requisition may now carry an IG one priority, but when the requisitioner puts 777 in the Required Delivery Date (RDD) block the system understands that the high priority is assigned only to penetrate protected inventory

levels. Expedited shipment for this requirement is not necessary. The "modified UMMIPS procedures" allow the supplying activity to make that determination. [Ref. 1:p. 2-11]

3. Reducing the Navy Transportation Bill

It is understood that the modified UMMIP system is vulnerable to abuse by customers and these shortcomings are addressed by the Air Challenge Program. The Air Challenge Program is designed to screen shipments in order to eliminate unauthorized commodities and items that exceed aircraft capacities. Navy policy requires reviewing all CONUS moves over 150 pounds and all out-CONUS moves regardless of the weight. Three fourths of air eligible shipments challenged are downgraded to surface shipment for an annual savings of over \$175 million. [Ref. 4:p. 2.4]

Another method in which the Navy is reducing its total transportation bill is through Supply Management Inspections. An example is the requirement that the Commander Naval Surface Forces Atlantic Fleet (CNSL) has imposed by limiting the amount of issue group 1 and 2 requisitions to 50% of the total requisitions initiated by an activity.

4. DLA Two Tier Pricing System

Colonel Bill Endres USAF at DLA headquarters is currently proposing a drastic change to the way we in the military determine and account for transportation of DLA

managed material. Colonel Endres' idea is that we completely separate the transportation decision from UMMIPS and in its place utilize two levels of service. The standard level of service will provide delivery of the requisitioned material IN-CONUS within twenty one days and the premium level of service will provide delivery within thirty six hours. Though still in the planning stages, Colonel Endres states that the standard price will include a surcharge of 2.5% of the item's value while the premium price will have a surcharge of about 20% of the item's value. Current DLA managed material carries a flat 2.5% surcharge that covers both first and second destination shipping charges. [Ref. 7]

When interviewed, Colonel Endres cited Donald Shycoff's idea of unit costing as the basis for his proposal. He further went on to say that for his idea to work each activity would have to be assigned a transportation budget.

5. Discussion of two tier pricing proposal

The two tier pricing system as discussed by Colonel Bill Endres contains several economic inefficiencies. For example, basing the surcharge on the value of the material being shipped is inefficient. By failing to adequately address the driver in the shipping equation, namely physical characteristics of the shipment (usually weight, distance, and commodity type), little if anything is gained in the way of efficiency. Under this proposed system, the transportation

budgets each requisitioner will control will be ineffectively expended since customers will be more willing to incur premium transportation costs on low value requisitions. Basing the surcharge on the material value under these circumstances could yield disastrous results for Navy transportation budgets since it would cost significantly more to ship a ton of sand than a personal computer. A shipment cost determination method similar to the type utilized by mail order catalog merchants, such as J.C. Whitney, would yield significantly more efficient shipment charges. In this method, the merchant employs a matrix that the customer utilizes to estimate the shipment charges. By considering both size and distance, the merchant can easily offer many levels of shipment service from which the customer can select.

B. RESPONSES TO DLA TWO TIER PRICING PROPOSAL

The two tier pricing system is a hotly debated topic between the Navy and the Defense Logistic Agency (DLA). DLA is moving forward with Mr. Shycoff's idea that all activities within DOD will soon be utilizing the unit costing method. As stated previously, the currently popular notion of unit costing as a method of measuring efficiency is flawed according to many economists. Unfortunately the opinion of many economists has little effect on government policy in light of the political pressure DOD is experiencing during the current downsizing.

During this thesis research, several transportation experts throughout the DOD transportation system were surveyed. All were familiar with the economic inconsistencies of unit costing and the two tier system. Commander Dave Courter at NAVSUP agrees with DLA that the customer is the source of excessive transportation costs but disagrees that the answer lies in allocating transportation budgets to cost centers. As a Naval Officer, he understands that a ship's schedule and tempo of operations drives the demand for material, and for that reason the allocation of transportation budgets to ships would be difficult, if not impossible, to manage as recommended by DLA. He suggests maintaining the budget at a type commander or higher level to dampen the impact any individual ship might generate. He understands that this alteration of the DLA plan effectively disarms the mechanism that would force the cost center to carefully scrutinize their transportation expenses, but sees no other way to manage a transportation budget. [Ref. 9]

Captain D. Munroe, the Commanding Officer at the Navy Material Transportation Office, has a different objection to the DLA proposal. He sees limiting service to only two levels as increasing transportation expenditures. In support of his view he suggests that the less-than-thirty-six-hours and less-than-twenty-one-days delivery time frames provide insufficient options for the Navy. He predicts that DLA's proposal will actually result increase the Navy's demand for premium

transportation. He defends the modified UMMIP system and cites its responsiveness to customer demands. He agrees that there is some abuse of UMMIPS but is confident that the majority of poor transportation decisions are caught by the stringent Navy air challenge thresholds [Ref. 10]. When asked about the viability of cost centers maintaining their own transportation budgets, he agreed with the NAVSUP opinion that the tempo of operations is what drives demand for material. It would be very difficult to effectively fund activities without impacting readiness.

Captain Rorex, N4, is the Navy sponsor for DMRD 915 and likes the idea of forcing the requiring activity to consider transportation costs when ordering material. However, he disagrees with the method that DLA chooses to allocate costs. He sees the allocation of transportation costs based on a percentage of value as incorrect. His idea is to implement the two tier system but to more accurately reflect the actual transportation cost in the price. This method requires a much more sophisticated pricing model but would fairly result in the activity considering actual transportation costs. Utilizing Captain Rorex's suggestions, the allocation of transportation dollars would not be as critical since the entire pricing system would be reevaluated. The current 2.5% of the value assigned to all DOD parts would become obsolete and each part would more accurately reflect the total cost incurred by DOD for transportation. As Captain Rorex

observed, assessing a surcharge for transportation based on value will have activities considering costs, but unfortunately the wrong ones. If the goal is to reduce transportation costs, any surcharge must be based on the actual or projected cost to transport material. Additional savings would be gained since administrative transportation overview policies such as the Air Challenge Program and auditing would no longer be required [Ref. 11].

C. CONCLUSION

Unit costing is viewed by many in DOD as a way in which the government can ensure the most efficient use of limited funds. As discussed, many doubt that unit costing is founded upon solid economic principals or that it can be applied to a non-profit organization.

The two tier pricing program that DLA is proposing is cited as a move towards unit costing. In actuality, it is only a modification of the current UMMIPS system with a few variations. The decision to base the transportation surcharge on a percentage of value has no foundation, just as in the current UMMIP system. DLA's assertion that there is excessive demand for premium transportation since the requisition does not bear the cost is accurate. By shifting the cost of transportation to the requisitioner they will more thoughtfully consider the financial impact of premium transportation. Unfortunately, the value of the material has

no link to the transportation costs, so the cost center would consider the wrong factors during the transportation decision. Considering these facts, DLA's two tier pricing system has little if anything in common with unit costing except that the cost center would hold a transportation budget and pay all transportation costs incurred.

Another factor that the two tier pricing system fails to address is the disproportionate factor by which AMC is supported by transportation funding. AMC's mission is readiness through flying hours. A disproportionate amount of funding for this command is generated via it's cargo handling activities. Rates on AMC missions have in the past exceeded those on the open market. When these facts are considered, it becomes clear that unit costing is not an appropriate method by which to control spiraling transportation costs.

IV. ANALYSIS OF THE COSTS AND CAPACITY OF ORGANIC AIRLIFT

A. BACKGROUND

This discussion explores the state of organic military airlift demand and how it is affected by various DOD policies. Also included is a critique of a study conducted by the Logistics Management Institute in which they analyzed the 1989 Air Mobility Command's (AMC) practical experiment to extend cargo holding times. Finally, the chapter concludes by assessing the recommendations reached by the AMC and LMI.

The AMC's primary mission is to develop and maintain an Air Force capable of performing airlift support in the event of national emergency. As a consequence of training, AMC has evolved into the primary provider of air cargo transportation for the military during peacetime. Though not its primary mission, using AMC as the mover of choice for military cargo provides significant revenues to defray its training costs.

AMC ships cargo with both AMC organic aircraft and contracted airlift services from the private sector. These contracted services are conducted under Civilian Reserve Air Fleet (CRAF) agreements. CRAF contractors receive guaranteed quantities of freight during peacetime in return for providing predetermined levels of support in the event of a national emergency.

Through the mid 1980's, AMC enjoyed success in generating revenue through their air cargo business, but recent defense cuts have significantly reduced cargo shipments. By 1987, declining transportation budgets reduced the cargo moved by AMC by 30%. During the same period, AMC's aircraft capacity remained relatively constant, resulting in sharply lower aircraft utilization rates.[Ref. 11:p. iii]

AMC planners have compensated for these shrinking cargo levels by diverting CRAF cargo to AMC organic flights. Although diverting this cargo has effectively corrected the funding shortfall, congressmen who represent the CRAF contractors and their employees are applying increasing pressure to prevent any further diversions. If this congressional pressure continues, the Air Force will have little choice but to augment the AMC DBOF/T subaccount with money from other Air Force sources [Ref. 12].

Until the Joint Chiefs of Staff (JCS) and the Air Force can determine the future AMC mission and the aircraft required to support it, they must be willing to continue current levels of financial support. That support might come by increasing either training appropriations or reimbursement levels for JCS exercises. In any case, a coordinated effort in the area of strategic planning is in AMC's best long term interest.

In an effort to increase sagging aircraft capacity utilization rates, AMC experimented with extending the length of time it holds cargo at the air port of embarkation (APOE).

During this experiment, AMC increased the overall APOE holding time from a historical average of 48 hours to 55 hours. This raised aircraft capacity utilization rates by 3%. The Air Force controlled the impact of this experiment on other areas of the UMMIPS time line by reducing the intransit time and processing time at the air port of debarkation (APOD). The linking factor in this hypothesis is the assumption that the amount of cargo shipped organically by AMC can be increased. This additional cargo is to be generated by diverting a larger portion of CRAF-designated cargo to organic flights.

The Air Force has attempted several additional actions to increase aircraft capacity utilization. Among the more productive actions were canceling the proposed expansion of the CRAF program and implementing scheduled service between heavily utilized freight shipment points.

The May 1990 UMMIPS revision that required all requisitions to include an RDD or equivalent entry made this experiment possible. Prior to this change, there was no way to ascertain the required delivery date for all requisitions. Under the current system, the determining factor for making transportation decisions is the assigned issue group priority. The requirement to make an RDD entry allows the supply system to separate inventory issue decisions from transportation decisions. [Ref. 11:p. 2-5]

1. Reduced Airlift Demand

The reduced airlift demand that developed from the declining transportation budgets appears as an overcapacity of AMC aircraft. This excess aircraft tonnage must be considered when analyzing the aircraft utilization question. Figure 4-1 graphically represents the interrelationships between cargo holding time, level of cargo movement and the aggregate capacity of AMC aircraft. The isoquants are utilized to illustrate two levels of cargo movement with level two being larger than level one. Figure 4-1 has no quantitative value; its sole purpose is to demonstrate the trade offs between the three variables. If aircraft capacity is held constant at AC_a (rather than being reduced to AC_b) and cargo holding time is increased from "a" to "c", organic cargo increases from level one to level two. [Ref. 11:p. 1-2]

The Air Force does not necessarily see the current aircraft tonnage of AMC as being critical to its effective operation but rather views it as the least manipulable of the three components in Figure 4-1. AMC planners see the remaining variables, namely increased cargo holding time and increased organic cargo, as having the most potential for reconciling operating funds and expenditures.

2. UMMIPS Time Frames

The Air Force's proposal to reallocate the days contained in the UMMIPS time frames is not a new idea. Table

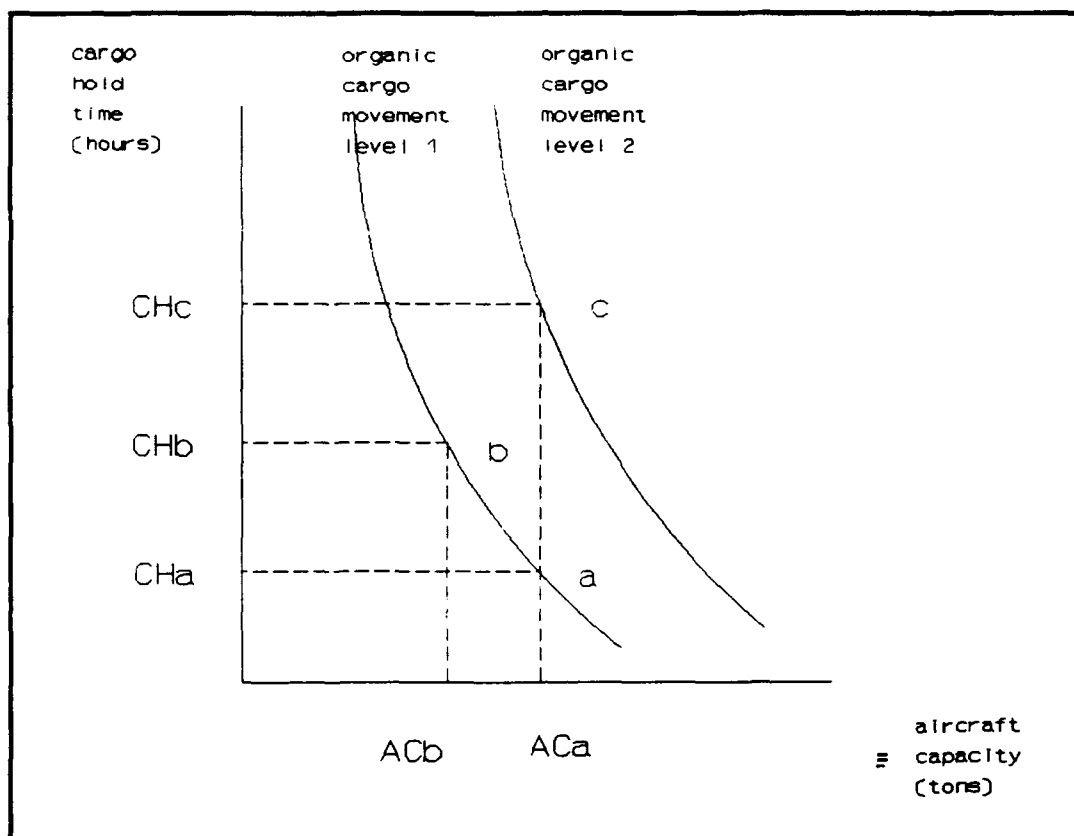


Figure 4-1 Critical Components Of AMC Operations

4-1 shows the current system along with DOD and Air Force proposals. Recognizing the drastic improvement in the requisition processing times made possible through automation, DOD decided that it was unrealistic to designate two days for requisition submission/passing action. At the same time, Air Force representatives were trying to solicit support for additional time during the AMC possession period (segments 6 to 8 in Table 4-1). As a result of these two ideas, the proposed DOD breakdown is currently being considered. Since the time that the above proposal was submitted for consideration, the Air Force has decided that assigning

TABLE 4-1 UMMIPS TIME STANDARDS FOR TP-1 EUROPEAN SHIPMENTS

Pipeline segment	Current	DOD	Air Force
1. Requisition submission	1	1	1
2. Passing Action	1		
3. Inventory control point availability determination	1	1	1
4. Depot/storage site	1	4	4
5. CONUS intransit	3	2	
6. APOE processing		1	
7. Intransit overseas	4		4
8. APOD processing		1	
9. Intratheatre intransit		1	1
10. Receipt by requisitioner	1	1	1
Total order-ship time	12	12	12

Source: Office of the Secretary of Defense

specific time periods to each segment would limit the effect of increased cargo holding time. As a result, the Air Force has submitted its own version for consideration that provides the same four days to the AMC possession period but without the restrictions in the DOD plan.

The only difference between the DOD and Air Force proposals is that the Air Force version removes the fixed time limits imposed on AMC managers during the AMC possession period (segments 6 to 8). AMC suggests that by eliminating the artificial time limits during their possession period, APOE times could be extended, paving the way for increased aircraft capacity utilization. [Ref. 11:p. 1-4]

B. EFFECT OF CARGO HOLDING ON AIRCRAFT UTILIZATION

The Air Force contracted with the Logistic Management Institute (LMI) in Washington DC to develop a statistical model to assess the validity of the results of their 1989 cargo holding experiment. In developing of their model, LMI reasoned that the benefit of cargo holding time extensions would only occur if additional cargo could be generated assuming aircraft capacity is fixed. Although the LMI model seems to make intuitive sense, the report fails to provide sufficient data to allow an unqualified validation. In particular, it is difficult to link the model to the experiment because the model holds the volume of cargo movement constant while the experiment was designed to shift cargo from CRAF to AMC.

Equation 1 is the LMI-developed mathematical representation of the discussed relationship. Equation 1 is expressed in linear form and shows that cargo movement (CM) is a function of aircraft capacity (AC), cargo holding time (CH), and transportation budgets (TB). The coefficients for both aircraft capacity, b, and cargo holding time, c, should be positive, signifying that increases in either would increase the amount of cargo moved. Declining transportation budgets should have a depressing effect on cargo moved, resulting in a negative e coefficient. [Ref. 11:p. 2-2]

$$CM=a+b*AC+c*CH+e*TB$$

[Eq 1]

From Equation 1, LMI represented the quantitative tradeoff between aircraft capacity and cargo-holding time when moving a fixed amount of cargo. Differentiating Equation 1 yields Equation 2. [Ref. 11:p. 2-2]

$$d(CM) = bd(AC) + cd(CH) + ed(TB) \quad [Eq 2]$$

To determine the tradeoff between capacity and holding time, LMI chose to hold cargo movement constant and the transportation budget constant. This was achieved by mathematically setting $d(TB)$ and $d(CM)$ equal to zero, and solving for the tradeoff between aircraft capacity and cargo-holding time, as shown in Equation 3. [Ref. 11:p. 2-2]

$$d(CH)/d(AC) = -b/c \quad [Eq 3]$$

LMI estimated that AMC would meet a given level of cargo movement by reducing aircraft capacity and increasing cargo holding times according to the ratio $-b/c$. [Ref. 11:p. A-2]

LMI's model shows that for every 15 percent increase in world-wide APOE cargo holding time, AMC would increase aircraft capacity utilization by about 3 percent. Table 4-2 displays the linearly projected increases in cargo holding time based on the LMI model. Interestingly, these gains in aircraft utilization are consistent with those that AMC experienced when they conducted their practical experiment. [Ref. 11:p. 2-2]

1. LMI Assessment of Delivery Quality

LMI conducted a survey to determine the impact of the FY89 AMC experiment on customer service. The questionnaire, included in an Appendix, was forwarded to the following commands:

- Commander in Chief Atlantic Fleet
- Commander in Chief Pacific Fleet
- Pacific Air Forces
- U.S. Air Forces Europe
- U.S. Army Forces Europe

The instructions accompanying this survey were to distribute it to 5% of each command's activities. Of the responses returned, the majority stated that less than 2% of AMC shipments were late. Although the results of this survey seem to support LMI's findings, the less than scientific methodology is questionable. Expecting a customer to review material receipts that are up to a year old to determine if

TABLE 4-2 EFFECT OF CARGO-HOLDING TIME ON AIRCRAFT UTILIZATION

CARGO-HOLDING TIME (HOURS)	PERCENT CHANGE FROM 2 DAY STANDARD	AIRCRAFT UTILIZATION (% INCREASE)
55	15	2.6
60	25	4.3
65	35	6.0
70	45	7.6

Source: Logistics Management Institute

AMC was responsible for its late delivery based on the RDD is unreasonable. Operating forces have no way of determining what segment of the supply system was responsible for the lateness of a shipment. Additionally, an RDD was not a mandatory entry on requisitions until May of 1990, making analysis of other than "expeditious" requirements impossible. With regard to material that requires expeditious shipment, the entry "999" only denotes that the material requires the fastest possible shipping mode. The requisitioner is unable to make any type of judgement as to the effectiveness of the AMC system based on when the required 999 part is received. The survey was designed as if the respondents were aware of the cargo holding time experiment and were documenting their experiences as they occurred. It is optimistic on the part of LMI to assume that the respondents thoroughly investigated their historical records when responding to this five question survey.

2. LMI Conclusions

The LMI study concludes with the following recommendations to the Assistant Secretary of Defense (Production and Logistics) ASD (P&L):

- The ASD (P&L) should issue a policy memorandum directing AMC to place greater emphasis on meeting RDDs and authorizing expanded flexibility and responsibility for managing its portion of the logistics pipeline.

- The ASD (P&L) should issue a policy memorandum authorizing AMC additional time in the logistic pipeline, separate from that of the intratheatre managers. The additional time should come from the requisition submission/passing time segment of the UMMIPS pipeline as in the pending DOD proposal.
- The ASD (P&L) and AMC should develop a reporting mechanism to monitor AMC's performance based on a combination of measures including shipment receipt dates, RDDs and UMMIPS time frames.
- AMC in conjunction with the ASD (P&L) should undertake a comprehensive review of wartime and peacetime airlift requirements to reconcile both strategic and efficiency concerns.

Of these recommendations, the reconciliation of strategic and efficiency concerns seems to be paramount. As cargo revenues continue to decline, AMC training budgets will be required to support increasingly higher portions of the AMC budget. To solve this dilemma, LMI and AMC are proposing to modify both UMMIPS and the associated measures of effectiveness. Although these changes can provide AMC with substantial latitude in scheduling efficiency, the overcapacity of organic aircraft in peacetime is still a major problem.

LMI's suggestion to alter the UMMIP system to facilitate extending cargo holding time will not solve AMC's long term problems. Currently, supply system customers give little thought to the assignment of an RDD when submitting a requisition. If, as AMC suggests, a new emphasis is placed on the RDD, customers will more carefully consider their true requirements. When it becomes apparent that the RDD estimate

will determine if a requirement receives air shipment or not, customers will begin to routinely assign an appropriate RDD.

The assertion that removing all RDD shipments from the scrutiny of UMMIPS will enable AMC to more effectively manage urgent 999 shipments is speculation. First, it assumes that removing RDD assigned shipments from the scrutiny of UMMIPS will make critical space available on otherwise filled planes. Overfilled AMC organic flights are not the problem. The problem is the difficulty that AMC is having meeting the UMMIPS timeframes for 999 shipments. Second, although managing shipments by the RDD (when applicable) will allow additional cargo holding time, the urgent 999 shipments will continue to drive the aircraft schedule. Providing AMC an extra day in the UMMIPS timeframe to manage 999 shipments may help in improving the current 82% on-time rate, but it does little to address the core problems of overcapacity and underfunding.

To adequately address the capacity and funding issues requires reviewing DOD's current strategic plans. The required size of the AMC fleet must first be determined by the Secretary of Defense, Joint Chiefs of Staff (JCS) and the Air Force. There has been no such review conducted since the demise of the Soviet Union and the subsequent reduction of forward deployed troops in Europe and the Far East. The subsequent reduction in cargo requiring air shipment has both idled AMC aircraft and reduced the delicate balance of funds

inflows and outflows from the AMC DBOF/T subaccount. Over the years, AMC has become increasingly dependent on the revenues generated by the air cargo transport business.

3. Analysis of LMI Conclusions

By pursuing the problem from an AMC fleet underutilization point of view, LMI fails to address the real issue: excessive aircraft capacity. Another problem with LMI's study occurs with their review of and concurrence with AMC's assessment of customer support during AMC's practical experiment. Their agreement with AMC that customers experienced little or no decline in service during the AMC 1989 experiment is presumptuous. The survey design and sampling techniques resulted in a questionable conclusion.

In their final recommendations to the Air Force and OSD, LMI suggests a realigning of AMC aircraft capacity to reflect revised requirements. LMI's failure to consider eliminating fleet assets and increasing dependence on the CRAF to simplify future business fluctuations is parochial. Overlooking this obvious logical alternative makes LMI's recommendations dubious. Eliminating excess aircraft capacity must be considered in any discussion of potential solutions.

On its own merits, managing AMC cargo by customer-established RDDs has great potential. Often issue group (IG) one and two requisitions are assigned such designations only to penetrate inventory levels. Providing transportation

priority based on inventory access requirements is improper. Transportation mode decisions based on the customer-provided RDDs are a logical procedural improvement.

Similarly, it is also logical to continue to manage 999 shipments under UMMIPS. An RDD of 999 denotes no specific RDD, only that the part is urgently required. The associated reporting criteria for both RDD entries of specific dates and 999 should be implemented as appropriate.

Providing AMC an additional day within the UMMIP system (obtained from the requisition submission/passing time) is appropriate. Vast improvements in the requisition referral system have reduced the time required for submission and passing action to less than an hour in most cases.

The problems of aircraft underutilization and insufficient AMC budgets have been exacerbated since AMC and LMI considered this problem in 1990. The ability to extend cargo hold time and to divert cargo from CRAF to organic flights has been fully exploited. AMC is being forced to spread AMC's fixed costs over fewer and fewer shipments. Relief from this situation can only be achieved by either reducing the number of aircraft assigned to AMC or by implementing a systematic layup of selected aircraft. [Ref. 13]

By reducing the number of aircraft, AMC can effectively increase aircraft utilization by extending cargo holding time with the current levels of cargo. Any additional

decreases to transportation budgets will require further reductions of AMC force assets and increases to cargo holding times in order to maintain the established revenue/expenditure ratio.

V. SUMMARY

In review, this thesis addressed many of the current concerns of military planners with regard to transportation issues being faced during the current DOD downsizing.

Chapter II discussed a proactive president issuing the DMR that called for specific levels of savings within DOD. These specific savings goals were assigned to individual areas of responsibility throughout the department. Responsibility centers then responded with DMRDs that identified where improvements would occur. The DMRDs that pertained to transportation savings were then examined in detail. In-depth analysis of these transportation related DMRDs was then conducted to establish a knowledge base for comparing and contrasting the competing initiatives. The analysis concluded by discussing the major areas of concern with regard to cost savings within the DOD transportation system.

Chapter III attacked the issue of unit costing and the DLA two tier pricing proposal. First, the underlying economic principles of unit costing were presented. This analysis showed that the acting DOD Comptroller considered the wrong costs. Second, the current UMMIP system and the proposed two tier pricing program were compared in detail. Finally, various DOD policy makers were surveyed to determine the acceptability of the DLA proposal across the various services.

The economic inconsistencies of the DLA two tier pricing program were summarized along with its associated shortcomings. The primary problem was the lack of a realistic link between the actual shipping costs and the charge the customer is assessed.

Chapter IV examined the costs and capacities of organic airlift. It opened with a review of the problems that complicate AMC's strategic airlift mission. The relationships between cargo holding time, available aircraft capacity, and cargo movement levels were examined to determine what options are available to AMC planners in their efforts to reconcile funding shortfalls in the DBOF/T account. If AMC's main mission is providing assets and personnel for emergency mobility, this has to be provided regardless of cargo shipped. To a large extent the capital and personnel are fixed costs. Marginal costs only involve expenses over what is necessary for training. Next, a report that was conducted by LMI for the Air Force was critiqued to assist the reader in evaluating the foundation on which AMC bases its argument for changes in the UMMIP system and cargo holding times. Included in that report is a mathematical model which was offered as supporting validation for the AMC practical experiment results. Although this model makes intuitive sense, the LMI report doesn't include sufficient data to allow an independent assessment.

In conclusion, the lack of emphasis placed on reducing the number of aircraft in the AMC is inappropriate. The analysis

does not prove the potential for system-wide savings for a number of the policy initiatives. Specifically, if AMC's main mission is providing assets and personnel for emergency mobility, this has to be provided regardless of cargo being shipped. To a large extent, the capital and personnel are fixed costs. Marginal costs only involve expenses over what is necessary for training. If we use Shycoff's unit costing theory which requires 100% cost recovery we will charge much more than the marginal cost of shipping. This could inappropriately shift shipments from air transport, where marginal costs are low, to other modes where marginal costs, but not average total costs, are higher.

On the positive side there are potential cost savings from managing shipments by the RDD and providing an additional day to AMC in the UMMIPS time line. These recommendations may be cost effective.

APPENDIX. LMI QUESTIONNAIRE

SHIPMENT TIMELINESS QUESTIONNAIRE

This appendix presents the complete questionnaire that was sent to several major commands soliciting their experience with the quality and timeliness of Military Airlift Command (MAC) deliveries during FY88 and FY89.

INSTRUCTION

Your unit has been selected to assist the Logistics Management Institute (LMI), Bethesda, Maryland, in an assessment of MAC's experimentation with its shipping-possession times. Experimentally, MAC has increased its serial port of embarkation cargo-holding times to enhance aircraft utilization, while it decreased other possession times, mindful of your delivery requirements.

The central question is: How, if at all, have your delivery times been affected by such changes in procedure? The attached, brief questionnaire is designed to answer that question.

If you need any clarification or further information about the questionnaire, feel free to contact Larry Schwartz, LMI - 301-320-7276. Please FAX your completed questionnaire to LMI, 301-320-5617, by [various dates].

Thank you, in advance, for your cooperation.

QUESTIONNAIRE

1. Indicate your primary receiving area for MAC airlift shipments; and your name, title, unit, and Autovon number.

Primary Receiving Area

Name and Title

Unit and Autovon

(Answer the remaining questions with respect to MAC airlift for your primary receiving area.)

2. What percentage of your FY88-FY89 shipments did not meet your required delivery times? Please check the box that most accurately reflects your experience.

- ☐ Less than 2 percent late
☐ 2 percent - 5 percent late
☐ 6 percent - 10 percent late
☐ 11 percent - 20 percent late
☐ Greater than 20 percent late.

(If you answered "less than 2 percent," you have completed the questionnaire. Otherwise, continue answering the questionnaire.)

3. In which fiscal year did you experience the most delays? Please check the appropriate box.

- ☐ FY88
☐ FY89

4. Specify six Transportation Control Numbers (TCNs) that represent particularly late shipments between March 1988 and October 1989.

a. _____ b. _____ c. _____

d. _____ e. _____ f. _____

5. Provide a case history for two of the TCNs selected in answer to question 4. You may provide a handwritten response. Please include the following in your answer:

- a. Shipment category, e.g., cargo, personal property, security assistance
- b. Required delivery date (if specified)
- c. Number of days or hours late
- d. Reason for lateness, e.g., MAC delay, not in stock, or late shipment from depot.

(You have completed the questionnaire.)

LIST OF REFERENCES

1. UnderSecretary of Defense (Acquisition), Reducing Transportation Cost Study. 1988.
2. Vice ADM Stanley E. Arther, USN "The DMR Challenge" Supply Corp Newsletter Sept./Oct. 1990; p. 6-7.
3. Commander Daniel Stone, SC, USN "Reduced Supply System Costs" Supply Corp Newsletter Sept./Oct. 1990; p. 8-9.
4. Mr. John McDonald, NAVSUP "Supply Depot Consolidation" Supply Corp Newsletter Sept./Oct. 1990; p. 10-12.
5. Captain John Hekman, SC, USN, "Inventory Control Point Consolidation", Supply Corp Newsletter Sept./Oct. p. 21-23.
6. William R. Gates, "Implementing Unit Costing: Efficiency in Training Policy to Practice" OSRA/TIMS Joint Annual Meeting Notes, November 1992.
7. Colonel W. Endress, USA, Defense Logistic Agency, Phone Interview, Washington D.C., July 1992.
8. Commander D. Courter, USN, Naval Supply Systems Command, Phone Interview, Washington D.C., July 1992.
9. Captain D. Munroe, USN, Navy Material Transportation Office, Phone Interview, Norfolk Va, August 1992.
10. Captain Rorex, USN, Phone Interview, Naval Supply Systems Command, Washington D.C., August 1992.
11. Mr. M. Neitemeir, Budget Officer, Air Mobility Command, Phone Interview, Scott AFB, September 1992.
12. Mr. Larry Schwartz, Logistic Management Institute, Enhancing Aircraft Utilization 1990.
13. Mr. M. Neitemeir, Budget Officer, Air Mobility Command, Phone Interview, Scott AFB , September 1992.

INITIAL DISTRIBUTION LIST

	No. Copies
1. Defense Technical Information Center Cameron Station Alexandria VA 22304-6145	2
2. Library, Code 052 Naval Postgraduate School Monterey CA 93943-5002	2
3. Professor Dan C. Boger Department of Administrative Sciences Naval Postgraduate School Monterey CA 93940-5002	2
4. LT Thomas F. Wiechelt Navy Material Transportation Office Naval Base Norfolk Norfolk VA	2
5. Defense Logistics Studies Information Exchange U.S. Army Logistics Management Center Fort Lee, Virginia 23801-6043	1